Penn Lake Management Pathway

2025 – 2030

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Appendix

CITY OF
BLOOMINGTON
MINNESOTA

Penn Lake Management Pathway 2025 - 2030

List of Acronyms

CEM – Conceptual Ecological Model

DNR – Minnesota Department of Natural Resources

ERM – Ecological Results Map

FEMA –- Federal Emergency Management Agency

LGU – Local Governmental Unit

MNDOT – Minnesota Department of Transportation

MPCA – Minnesota Pollution Control Agency

MS4 – Municipal Separate Storm Sewer System

NGO – Non-Governmental Organization

NMCWD – Nine Mile Creek Watershed District

NPDES – National Pollutant Discharge Elimination System

TMDL – Total Maximum Daily Load

µg/L – Micrograms per liter

WCA – Wetland Conservation Act

Introduction:

The Penn Lake Management Pathway ("Pathway") is a planning document that details the strategy, intention, and associated actions items for City led management of Penn Lake over a five-year period. In this case, this is from 2025 – 2030. In 2030, work will begin to write a new Pathway (2030 – 2025). Every Pathway, including this one, was written using the procedure described in the Penn Lake Management Framework.

While this is the first Pathway to be written within the Penn Lake Management Framework it should be noted that over the years there have been many City led management projects in and around Penn Lake. In fact, prior to the adoption of the Management Framework, there were two previous City management plans specifically for Penn Lake. However, past management work was done on a project-to-project basis and there is not much information about the impacts of those projects. So, to keep things simple, this Pathway will be working from the baseline conditions that were described in the 2022 Biotic Assessment. Those results are summarized below in the section on the existing state of Penn Lake.

While the focus here is on City-led management, there are other government agencies working to improve the health of Penn Lake. Of particular importance is the Nine Mile Creek Watershed District (NMCWD). As it would happen, during the creation of the Management Framework, NMCWD was working on their own Penn Lake Water Quality Study (WQS). That is set up to be a ten-year management plan. The City has a strong relationship with NMCWD. So, we jumped at the opportunity to work with them and align our Pen Lake plans. Because the role of the City and Watershed District differ slightly, approaching management through a shared vision was helpful in improving resource allocation and timing for various management actions. This partnership is discussed further in the section on partnerships, regulations, and other agency authority.

The following document offers a description of what sort of management is proposed on Penn Lake and why. At the end of the document, there is a task section. This section lays out a list of initial management tasks that the City has identified for this round of management. At this stage of the work, there will be a focus on high level interventions. Mainly this is due to the fact that the Lake is so degraded and management will require a wide spread of interventions. These range from inspiring improved private land use across the watershed to fisheries management work in Penn Lake. Many tasks are unlikely to be fully completed within five years or they are repeating maintenance activities that never stop, like cleaning out sediment traps. Progress on these sorts of activities, completed work, and the potential for new activities will inform the next Pathway. For particularly complex projects, like infrastructure installation, management will strive to reach early milestones. These milestones are described in the section on infrastructure identification and prioritization.

Summary of proposed management

A driving force for current management is the impaired waters designation put onto Penn Lake by the Minnesota Pollution Control Agency (MPCA). Under that impairment, the MPCA is requiring the City to reduce phosphorus inputs into Penn Lake. The City does not receive nutrient management credit for in-lake activities. As such, watershed management is inherently a top priority. Unfortunately, reducing nutrient loading from stormwater runoff is also one of the most difficult things to accomplish.

Infrastructure interventions are an option. They can be used to mitigate pollution transport, increase pollutant capture, and mitigate risk of flood damage. However, high cost and complicated planning requirements are a significant barrier to implementation for infrastructure. In creating the Management Framework in 2023, an engineering analysis was completed to identify infrastructure opportunities across the watershed. That has provided valuable insights into infrastructure opportunities and it has allowed the City to work with NMCWD on identifying priority projects and designating who will lead them. For this Management Pathway, most of the work for infrastructure will be in the form of planning. We need to know more about estimated impacts and design considerations. However, there are a few smaller projects, like the sediment forebays on Lower Penn, that might be construction ready more quickly.

Aside from infrastructure, there are other watershed wide practices that the City plans to use to achieve nutrient load reductions. One priority will be to maximize the efficiency of existing city practices, such as sediment trap cleanouts, street sweeping, and de-icing salt reduction. Community participation can also help. Over the next few years, the City will be working on creating a program to inspire people to improve their use of private land, like installing raingardens or replacing turfgrass lawn with native meadow lawn. This will be a City led initiative but the NMCWD's grant program will be a significant resource for funding many of these projects. Since most of the land in the Penn Lake watershed is private, changing land use behavior could have a substantial impact on stormwater quality, though it would be a challenge to measure directly and would likely have to be inferred through rough calculation.

As mentioned, in-lake work does not count towards the City's obligation to reduce nutrient loading to Penn. However, that detail is only important from a regulatory perspective. The City and Watershed District place a high priority on Lake health and are proposing a lot of in-lake management activities. Selecting what will be prioritized first is based on existing lake conditions. These conditions were evaluated using conceptual ecological modeling (CEM) to identify key ecosystem components, like carp dominance, that play an outsized role in reinforcing the current lake characteristics. More information on the use of CEMs can be found in the Management Framework.

The 2022 Biotic Survey identified carp, goldfish, and carp-goldfish hybrids as the dominant fish type within both Upper and Lower Penn. Management of these fish is a high priority. This management will directly influence two of the Management Framework's central goals: good water quality, since carp create feedback loops that severely degrade water quality; and self-sustaining species diversity, because native species introduction is a component of carp management. It should also be noted that fish management will also include Adelmann Pond, which is hydraulically connected to Penn Lake. As progress is made on carp removal, prep work will begin to start conceptualizing a long-term program that is intended to rebuild a robust and healthy fishery that is the right fit for Penn Lake. A big part of that work will be to build upon partnerships with the Department of Natural Resources (DNR).

In coordinating with NMCWD, it was decided that they would lead the efforts in modeling the lake to identify how internal nutrient loading worked. That information is the basis for interventions, like alum dosing. This sort of intervention is dependent on successful carp management. Once those fish are successfully removed, at least to a certain population threshold, then alum dosing can be considered. It will probably take two years to get the fish under control. The goal of alum will be to reset the internal

loading mechanisms of the lake in the attempt to flip the lake to a healthier state. Based on conversations with NMCWD, it is likely that they will lead that effort but this will be decided closer to the time of work. Breaking the current internal loading scheme – long dominated by carp and blue-green algae – is critical to setting the lake up for more specific management interventions. Furthermore, it will help magnify the impacts that come from watershed wide nutrient load reductions. It is known that benefits from external load reductions are not realized to the same degree in lakes which are locked into a high internal loading regime as compared to lakes in a more desirable ecosystem state. Owing to this, watershed wide work must be done at the same time as internal lake work. The two are not mutually exclusive activities; they are mutually beneficial.

Closely associated with in-lake management, ecosystem enhancement of the wetland and nearshore areas around Penn Lake will be a priority. The City will focus on all the City owned land. Work will include tree management, invasive species control, and establishment of desirable native species. This work was identified because nearshore habitat and the Lake's littoral zone have a significant impact on the quality of habitat available for species use and, to some degree, it should help with nutrient regulation within the Lake. It should also play a role in mitigating bank erosion (which will also be benefited by the removal of carp). The lake shoreline that is privately owned will be managed in the same community program aiming to inspire ecologically healthy land use. The Penn Lake Community Group will also be a key resource in influencing good private shoreline management.

In conclusion, the proposed management for the 2025-2030 Penn Lake Management Pathway is designed to:

1. Start tying together many of the City processes that already exist, like street sweeping, into a cohesive strategy that centers the combined impact to Penn Lake.
2. Begin several new initiatives that cover many of the management functional groups (e.g. flora, fauna, hydrology, et cetera).

Because management is starting fresh, most of these management initiatives are very high level. If you look at the Ecological Results Map (ERM) provided in the management Framework, these projects are pretty much all concentrated on the outer rings. Ultimately, the progress achieved in the next five years will do a lot for setting the pace and direction of future management.

Summary of past management

As this is the first Management Pathway, there is no summary of past management to provide.

Existing state of Penn Lake

The biotic survey conducted in 2022 reveals that Penn Lake is in a highly degraded state, characterized by turbid water, low species diversity and the dominance of pollution/disturbance tolerant communities. The lack of submerged aquatic vegetation, dominance of Cyanobacteria in the planktonic community, and absence of small bait fish are significant indicators of a degraded trophic structure.

There are sustaining populations of green sunfish and black crappie, but the fish community is primarily composed of common carp, goldfish, and carp-goldfish hybrids. Most fishes seem to be living in Upper

Penn, but this finding could be influenced by a significant fish kill on Lower Penn that happened in the spring prior to the biotic assessment sampling. Interestingly, goldfish were only found in Lower Penn. This is a good sign because it signifies that the goldfish are not entering the Lake from upstream sources and were more likely added to Lower Penn through direct release.

The absence of submerged aquatic vegetation limits habitat availability for zooplankton and fish; and it influences poor water clarity, sediment quality, and composition. Blue-green algae, a toxin-producing cyanobacteria, dominate the phytoplankton community. They are likely supported by the high nutrient loads and warm water conditions. The zooplankton community composition is common for highly eutrophic lakes, with limited habitat for zooplankton.

Figure 1. Cylindrical papershell mussel observed in March 2022 after a spring fish kill. The mussel was dead at time of observation. In subsequent low water years, many shells were visible across the newly exposed shoreline. It is not known if there is a surviving population.

Wetland vegetation had limited to moderate diversity, with meadow/shallow marsh and forested/shrub wetland communities observed. There were manicured residential lawns but based on the 2022 biotic survey, shoreline property owners had a noticeable impact on wetland/nearshore health and plant diversity. Another optimistic finding, made by City staff, is that there seems to be a freshwater mussel population surviving in Lower Penn. While mussels were not found during the 2022 biotic survey, their shells are common on the Lower Lake's shoreline and a dead mussel, identified as cylindrical papershell (*Anodontoides ferussacianus*), with its body intact, was found in the spring of 2022 (figure 1).

Amphibian diversity is extremely low, reflecting the degraded environmental conditions of a shallow, urban lake. Bird species observed in the surveys indicate a mix of resident and migratory species, such as hawks, osprey, and bald eagles. There were resident turtles surviving in the Lake, primary common species, like painted turtles.

Being that this management Pathway was written shortly after the completion of a full biotic survey, that report provides an accurate description of lake characteristics. As of writing this Pathway, no management actions have occurred that would have changed the lake from what was seen in that report. NMCWD's WQS will offer management recommendations for improving water quality and the overall health of the lake, especially focusing on the management of in-lake nutrients.

Partnerships, regulations, and other agency authority

Penn Lake has an existing waste load allocation requiring the City to reduce phosphorus loading into Penn Lake by 40%. Working to meet this reduction is a priority for City management. Fortunately, this is in-line with the overall City goals of Penn Lake's management. Nutrient loading is a significant stressor to the Lake system and nutrient reductions will benefit future work to improve in-lake ecosystem quality. Partnerships will be pursued with the City of Richfield and MnDOT, both of whom are also working to meet their own Penn Lake nutrient total maximum daily load (TMDL). Other TMDL requirements that will impact management priorities are listed in Table 1.

The City's partnership with NMCWD is of particular importance. Their updated Penn Lake WQS includes feasibility studies for management actions that will enable NMCWD to allocate funds toward management initiatives. This can help maximize investments through project coordination between the City and NMCWD. For example, NMCWD might lead carp management and then the City can concentrate on abiotic habitat improvements. The WQS is particularly helpful in identifying sources and mechanics of nutrient loading into and within Penn Lake. That information is needed to plan for future interventions, like the use of flocculants (e.g. alum) for in lake nutrient management (stripping nutrients from the water column and sediment capping). In the case that the WQS makes a management recommendation that is not included in this Pathway, City staff will incorporate those recommendations into the overall mix of project planning. New information obtained from the WQS and/or recommended projects not mentioned in this Pathway will be detailed in the next management Pathway.

TMDL	Local Government Unit(s)	Regulatory Responsibility
Nutrient (phosphorus)	City of Bloomington	Reduce phosphorus loading to Penn Lake by 40%
E. Coli	NMCWD	Categorical TMDL without an assigned waste load allocation.
Chloride	Twin City Metro, NMCWD	Categorical TMDL without an assigned waste load allocation.

Table 1. TMDL requirements impacting Penn Lake management.

State agencies will also be valuable partners. The City will work to create relationships with these agencies to try and get ahead of barriers from permitting and interagency coordination. This will hopefully allow for quick action when lake conditions get to a point that when specific management initiatives requiring State-City partnerships are being pursued. For example, the Minnesota Department of Natural Resources (DNR) will play a significant role in wetland management and native fish stocking. It will therefore behoove the City to have the DNR on board with the fisheries management plan prior before any actual stocking is proposed.

Community priorities

The community was surveyed using the City's Let's Talk Bloomington webpage. The community survey results can be found in the appendix. It gauged community priorities through four survey questions:

1. What kind of participation opportunities interest you most
2. What do you value related to water quality and quantity
3. What do you value related to ecosystems
4. What do you value related to outdoor recreation

The first question helped to understand how the community would like to participate in the management process. It also related to question four, on recreation. That question was about the programs or opportunities people might be interested in. Together, these questions provides the City with an insight into how to best involve the community in aspects that they value.

Based on the responses, this Pathway will prioritize the creation of a Penn Lake community group (PLGC), community science opportunities, and volunteer/event planning opportunities. The PLGC and volunteer/event planning will be valuable community tools in helping to coordinate the formation of groups, activities, and volunteer events. The top two desired events were trash pickups and community ecosystem improvement work. Since the long-term success of these activities depends on community champions, the City plans to use the PLGC to determine how to implement community participation opportunities that can persist long term and are not just one-off events.

The second and third questions were helpful in understanding the ecological characteristics that are important to the community. The top four community ecosystem priorities are birds, fish, wetlands, and ecosystem health across Penn Lake's watershed. Fishery tasks are outlined in the fauna functional group. Wetlands are covered in flora. The inclusion of nest boxes within abiotic habitat is the only specific task related to birds, but all ecosystem improvements should benefit bird communities. Enhancing ecosystem health throughout the watershed will be specifically addressed in the Community Participation functional group through the task of improving private land management. More details about these projects are provided in the tasks section below.

The third and fourth questions also explored participation opportunities, and these priorities will be further addressed in the Community Participation functional group through the Penn Lake Community Group Task.

Infrastructure identification and prioritization:

The engineering analysis (titled Penn Lake Hydrology Report) identified several infrastructure opportunities across the Penn Lake Watershed. Budget constraints, grant opportunities, priorities of project partners, and other factors will dictate the implementation timeline for each project. City staff, in partnership with NMCWD, assessed the infrastructure opportunities to identify which should be pursued first. This followed the prioritization analysis described in the Management Framework.

The list below contains the project options selected. The project numbers assigned in the engineering report are provided next to each project name. For a few of the sites listed below, more than one design

option from the engineering report is included to provide flexibility in the planning process. Because infrastructure projects are complicated and expensive, the goal for this Pathway is not necessarily installation. In fact, most of these projects are unlikely to be installed within five years. As such, a milestone is listed for each project. This will be the main task that will be pursued by staff over the course of this Pathway. If more progress is made, then all the better. NMCWD will also play a significant role in the progress on projects.

Infrastructure projects prioritization list:

1. Adelmann Pond (AP-2 & AP-8): The Adelmann Pond site is adjacent to Washburn Elementary School and Northwestern Health Sciences University, and residential properties. Athletic fields between the elementary school and the university have storm sewer lines that run along the west and south perimeter. These open spaces provide a high potential for cost-effective, regional stormwater treatment. AP-2 calls for a typical passive underground infiltration system designed to treat the 1.1-inch volume from impervious surface in the drainage area. AP-8 calls for a smaller underground chamber, potential infiltration, potential reuse for irrigation, and a pump to lift additional water to a floodable field, which will be normally dry for recreational use and flooded with stormwater following a rain event for it to infiltrate as it is spread over the field. Each option offers multiple benefits. Implementation of these projects would reduce nutrient loads to Penn Lake and Adelmann Pond. There are some flood reduction benefits and they present opportunities for a sustainable source of field irrigation water for the school district. The largest barrier for these projects is forming a partnership with the landowners, School District and Northwestern University. Since the City favors minimizing underground infrastructure, AP-8 is the preferred design.

   Milestone:

   a. Form a relationship with the school district and propose project concept.

2. Penn American storage system (PA-1 & PA-2): Retrofit of the Penn American storage system is a part of several other proposed infrastructure designs, mainly because they are all downstream and are benefited by the retention of water. The Penn American system also offers a relatively good cost benefit score and works to improve the efficacy of an existing, already successful watershed BMP. PA-1 only includes adaptive flow and the potential for extra underground storage. PA-2 includes that and the option for irrigation reuse of the stored water.

   Milestone:

   a. Conduct feasibility analysis of project. This should include more in-depth modeling and cost considerations.

3. 86th Street Water Control Structure (UP-1): Upper and Lower Penn Lake are connected by a passive water control structure and 60-inch diameter stormsewer across W 86th Street. UP-1 calls for the installation of automated stormwater infrastructure (such as an actuated valve or pumping system) to regulate and actively manage flows between Upper and Lower Penn Lake

based on certain conditions. At a relatively low cost, adaptation of the water control structure in Penn Lake to adaptive level control, could prove to be immensely beneficial. Its biggest benefit is flood risk reduction. However, it also offers opportunities for improved wetland management on Upper Penn, increased residence time and water quality treatment potential of Upper Penn, and various retrofit options for future BMPs.

Milestone:

a. Conduct adaptive level control system modeling and feasibility study.
b. Identify design options and begin permitting conversations with the MnDNR.

4. Trash Capture (HP-5): A floating trash capture device to be installed at the inlet structure of Upper Penn Lake. Trash capture is a unique BMP. It does not offer many additional benefits, but it does address an issue that other BMPs struggle to keep up with – floatable trash. It is also relatively affordable.

   Milestone:

   a. Conduct interviews with Minnehaha Creek Watershed District to discuss the efficacy of the trash capture device installed on Lake Hiawatha.
   b. Begin speaking with suppliers for more accurate pricing options.
   c. Coordinate with City Maintenance staff to discuss long-term maintenance and responsibilities.

5. Forebays (OF-5, OF-6, & OF-3): Retrofitting, rebuilding, or updating maintenance of the existing forebays along Lower Penn Lake is needed mainly due to the fact that they are not functioning as intended and have become a maintenance issue. This goes along with any water quality improvements. The northwest forebay is prioritized due to the size of the contributing watershed and a site layout that offers several retrofit options. The intention of OF-3, which is basically just a re-build of the existing forebay, can be modified for the other two forebays – lessons learned from work on the northwest forebay will be helpful in this regard. Additionally, a BMP like OF-5, a hydrodynamic separator or similarly intended structure, could be installed at all or some of the forebays in the future. The southeast forebay, which is the smallest and most difficult to get to, has a high potential to be identified for removal.

   Milestone:

   a. Reach 60% design plans and construction schedule for NW forebay.
   b. Decide on removal or reconstruction options for SE forebay.

Tasks:

The tasks are organized between seven management categories, described in the Ecological Results Map. The list below is not necessarily complete. Over the course of management, new tasks that have not been identified may come up. Those will be incorporated as needed and should be explained in the next Pathway's description of past management. For the most part, infrastructure projects are not included as a task. This is because they are a unique project type with very long and complicated implementation requirements. They also tend to influence multiple management categories, making it difficult to split them into one category or another.

I. **Monitoring and evaluation (M&E)**: No specialty data needs have yet been identified. M&E needs for specific projects, like carp management, will be created on an as needed basis.
   - Task: Continue Bloomington's Standard Monthly Water Quality sampling

II. **Community participation**: There are few existing community participation or interaction opportunities. Therefore, the main tasks for this Pathway are to start the work of creating programs and opportunities. The Penn Lake Community Group (PLCG), which was created in 2022 in part to assist the creation of the Management framework, will be utilized as the primary strategy to manage community interactions.
   - Task: Create community program to promote improved landscape management on private property. The program to be pursued is Bloomington Stewards. This program is intended to become a City-wide initiative.
   - Task: Provide assistance to the PLCG to create and test community interaction opportunities, such as, but not limited to:
     1. community science projects
     2. Testing of community programming
     3. Trash pick ups
     4. Plant management
   - Task: Partner with Parks and Recreation regarding their community programming opportunities.

III. **Flora**: Restoration of wetland and nearshore upland on City property will be the main City undertaking for vegetation management. Because it is directly connected ecologically, Adelmann Pond will be included in vegetation management. Restoring nearshore wetlands, many of which have been lost to historic filling, or restoring upland ecotypes (e.g. meadows) will depend on partnerships with Parks and Recreation. It should be noted that creating this partnership is a key task here and in community participation. Management of vegetation communities within private property will be covered by the community participation task of creating a social marketing campaign to improve landscape management habits.
   - Task: Ecosystem enhancement of existing wetland communities and near shore upland around Penn Lake and Adelmann Pond
   - Task: Partner with the City department Park Maintenance to create strategy to restore and maintain wetland and upland ecotypes surrounding Penn Lake and Adelmann Pond

IV. **Fauna**: Management of carp is priority (figure 1). Management will include Penn Lake and Adelmann Pond. Carp management will include native fish stocking. Many fish, like bluegill, are useful predators of carp eggs and young of year. This is also helpful in the goal of creating self-sustaining species diversity. A more robust fish stocking program will need to be planned for. It is estimated that an initial carp management initiative will take about two years. That timeline should benefit the task planning for future stocking.

- Task: Carp management in Penn Lake and Adelmann Pond. Reduce carp population below a biomass of 100 kg/ha (89.9 lbs/acre).
- Task: Stocking native fish species. This is a twostep task:
  1. Initial stocking will focus on tolerant species that aid in carp removal, like bluegill.
  2. Plan creation for long term stocking. This will depend heavily on creating partnerships with other government agencies, like the MDNR.
- Task: Repair control board and pump guard on winter aeration unit with new parts to ensure ongoing functionality. Future upgrades to the aeration unit depend on partnerships with Park and Recreation and on the Penn Lake Wellhead Initiative. In preparation for parkland reconstruction, options for aerator upgrades, like moving its location, should begin to be identified and presented for community input.

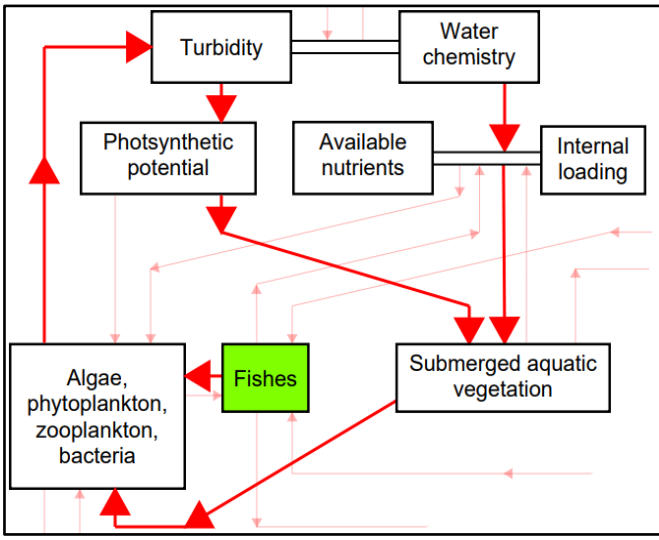


Figure 2. Summarized conceptual ecological model for fish management.Carp management is a priority because of the feedback loop created by carp dominance – as shown by the highlighted arrows. It will also benefit the impact assessments of other water quality improvements because their effect can often be lost within carp's dominating effect. This task touches on three of the four central goals of management: good water quality, self-sustaining species diversity, and high value ecosystem services.

V. **Abiotic Habitat**: The primary tasks for abiotic habitat interventions are erosion management and habitat structure. Erosion mitigation will pair closely with wetland restoration, hydrology (e.g. using adaptive flow to minimize bank erosion), and fisheries management (e.g. removal of carp). For the most part, it is not known where the worst areas of erosion are and how other tasks, like hydrology or fisheries management, will impact them. As such, erosion identification should be included as a part of carrying out those tasks. Specific fixes at particularly problematic areas can be done as the need arises. Many habitat structures can also be implemented any time. Abiotic habitat needs should become clearer and be implemented more strategically as management progresses.

- Task: Erosion identification and management. Tasks, such as existing wetland restoration, will likely include some erosion repair &/or mitigation. Other actions, like carp removal and

adaptive flow, are likely to affect the causative factors of erosion. Therefore, once areas of erosion are identified, the City can start to work through repairs of specific sites, based on anticipated impact of other management activities. It will be important that managers do not invest in an erosion intervention prior to dealing with the erosive cause, which could lead to system reversion back to an eroded state.

- Task: Explore installation of aquatic woody structures within the lake. Structures can be fully submerged, to prioritize fish and macroinvertebrates, or they can be partially submerged, adding bird and amphibian habitat. This task helps to address the lack of refugia in the lake, as mentioned in the recommendations section of the biotic survey – install as opportunity allows.
- Task: Identify opportunities for the installation of nesting structures for birds – install as opportunity allows
- Task: Identify opportunities for the installation of roosting structures for bats – install as opportunity allows

VI. **Pollution Prevention**: Many of the infrastructure options available offer ways to mitigate pollution transport and increase pollutant capture. Unique among them is the trash capture device, which is more of a soft infrastructure project because it can be put in and taken out on demand Besides infrastructure, the main tasks here are to maximize efficiency in ongoing City maintenance work, like sediment trap cleanout, street sweeping, and de-icing salt reduction.

- Task: Create prioritized street sweeping plan and content evaluation protocol for the Penn Lake Watershed – this is tied to the MPCA Street Sweeper Calculator. This is a City-wide initiative but due to its impairment the Penn Lake watershed is being prioritized.
- Task: Create monitoring and evaluation protocol of the accumulation rates of traps and how that corresponds with clean out schedules
- Task: Create Winter Intendance and Salt Elimination (WISE) Plan. Will include improved efficiency of salt use and strategies eliminating salt needs, like improved infrastructure design.

VII. **Hydrology**: Most infrastructure projects impact hydrology across the watershed, mostly in the form of increased infiltration. However, updating the 86th street water control structure would directly impact lake hydrology. Thus, its impact needs to be understood on a watershed scale – particularly downstream of the lake. The City will be partnering with NMCWD and the City of Edina to assess adaptive level control across the Nine Mile Creek Watershed. Penn Will be one of the investigation sites. The City will also be partnering with NMCWD to assess in lake nutrient loading, which should lead to management options, like alum. Due to carp's impact on sedimentation and nutrient availability, carp management will influence in-lake nutrient management.

- Task: Conduct adaptive level control analysis of Penn, utilizing the 86th street water control structure, and how it integrates into the wider watershed – partner with NMCWD.
- Task: Analyze in-lake phosphorus and implement management project (likely to be alum dosing) – partner with NMCWD.
- Task: Coordinate the Penn Lake Wellhead Initiative. This will tie into the repair of the winter aeration unit.

Management Category	Task	Description
Monitoring and evaluation	Water quality sampling	Continue Bloomington's Standard Monthly Water Quality sampling
Community participation	Community programming	Create a community program to promote improved landscape management on private property. The program to be pursued is Bloomington Stewards.
Community participation	Penn Lake Community Group (PLGC)	Assist the PLCG to create and test community interaction opportunities.
Community participation	Park & Recreation Partnership	Partner with Parks and Recreation regarding their community programming opportunities.
Flora	Wetland Management	Ecosystem enhancement of existing wetland communities and near shore upland around Penn Lake and Adelmann Pond
Flora	Park Maintenance Partnership	Partner with the Park Maintenance to restore and maintain wetland and upland ecotypes surrounding Penn Lake and Adelmann Pond
Fauna	Carp Management	Carp management in Penn Lake and Adelmann Pond. Reduce carp population below a biomass of 100 kg/ha (89.9 lbs/acre).
Fauna	Stocking native fish species	Initial stocking will focus on tolerant species that aid in carp removal, like bluegill and plan for long term stocking.
Fauna	Winter aeration	Repair control board and pump guard on winter aeration unit with new parts to ensure ongoing functionality.
Abiotic Habitat	Erosion management	Once areas of erosion are identified, the City can start to work through repairs of specific sites, based on anticipated impact of other management activities.
Abiotic Habitat	Aquatic woody structure	Explore installation of aquatic woody structures within the lake, either fully submerged, to prioritize fish and macroinvertebrates, or partially submerged, adding bird and amphibian habitat.
Abiotic Habitat	Bird nesting structures	Identify opportunities for the installation of nesting structures for birds – install as opportunity allows
Abiotic Habitat	Bat roosting structures	Identify opportunities for the installation of roosting structures for bats – install as opportunity allows
Pollution Prevention	Street sweeping	Create prioritized street sweeping plan and content evaluation protocol for the Penn Lake Watershed
Pollution Prevention	Sediment trap maintenance	Create monitoring and evaluation protocol of the accumulation rates of traps and how that corresponds with clean out schedules
Pollution Prevention	Salt reduction and elimination	Create Winter Intendance and Salt Elimination (WISE) Plan. Will include improved efficiency of salt use and strategies eliminating salt needs, like improved infrastructure design
Hydrology	Adaptive Level Control Study	Conduct adaptive level control analysis of Penn, utilizing the 86th street water control structure, and how it integrates into the wider watershed
Hydrology	In-Lake Phosphorus Management	Analyze in-lake phosphorus and implement management project (likely to be alum dosing)
Hydrology	Penn Lake Well	Coordinate the Penn Lake Wellhead Initiative. This will tie into the repair of the winter aeration unit.

Table 2. Summary of tasks. This list describes the main tasks identified as part of the 2025-2030 Penn Lake Management Pathway.

CITY OF
BLOOMINGTON
MINNESOTA

Penn Lake Management Pathway

Years: 2025 - 2030

Pathway Adoption

In acknowledgement that this Penn Lake Management Pathway was properly written, as outlined by the Penn Lake Management Framework approved by City Council on January 28, 2024, this Penn Lake Management Pathway is hereby certified and adopted by the City of Bloomington.

DATED: 7/12/24

BY: _____
Julie Long
City Engineer

Appendix 1 - Community Survey Results

Project Report

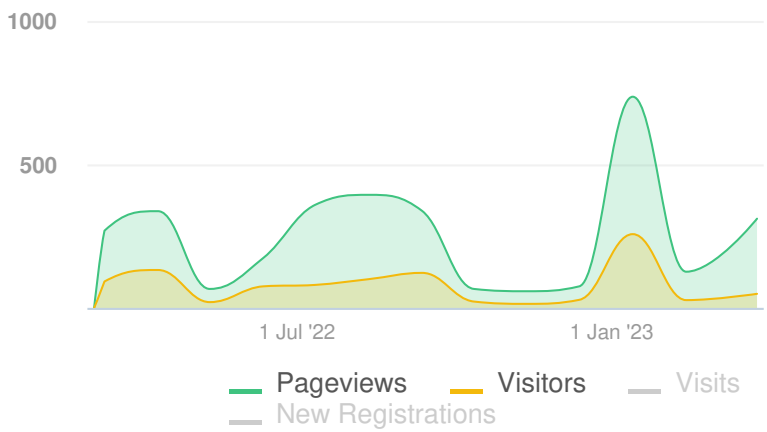
26 August 2020 - 14 March 2023

Let's Talk Bloomington

Penn Lake Rehabilitation and Restoration

BANG THE TABLE engagementHQ

Visitors Summary



Highlights

TOTAL VISITS
1.2 k

MAX VISITORS PER DAY
68

NEW REGISTRATIONS
41

ENGAGED VISITORS
152

INFORMED VISITORS
386

AWARE VISITORS
727

Aware Participants	727
Aware Actions Performed	**Participants**
Visited a Project or Tool Page	727

Informed Participants	386
Informed Actions Performed	**Participants**
Viewed a video	0
Viewed a photo	15
Downloaded a document	95
Visited the Key Dates page	0
Visited an FAQ list Page	66
Visited Instagram Page	0
Visited Multiple Project Pages	220
Contributed to a tool (engaged)	152

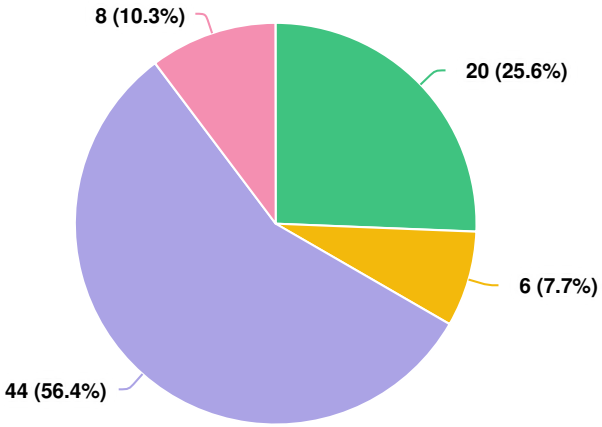
Engaged Participants	152		
Engaged Actions Performed	**Registered**	**Unverified**	**Anonymous**
Contributed on Forums	0	0	0
Participated in Surveys	59	4	76
Contributed to Newsfeeds	0	0	0
Participated in Quick Polls	0	0	0
Posted on Guestbooks	0	0	0
Contributed to Stories	6	13	0
Asked Questions	0	0	0
Placed Pins on Places	0	0	0
Contributed to Ideas	0	0	0

ENGAGEMENT TOOL: SURVEY TOOL

Initial Survey

Visitors 140	Contributors 79	CONTRIBUTIONS 79

This program is in its early stages. How would you like to stay informed?



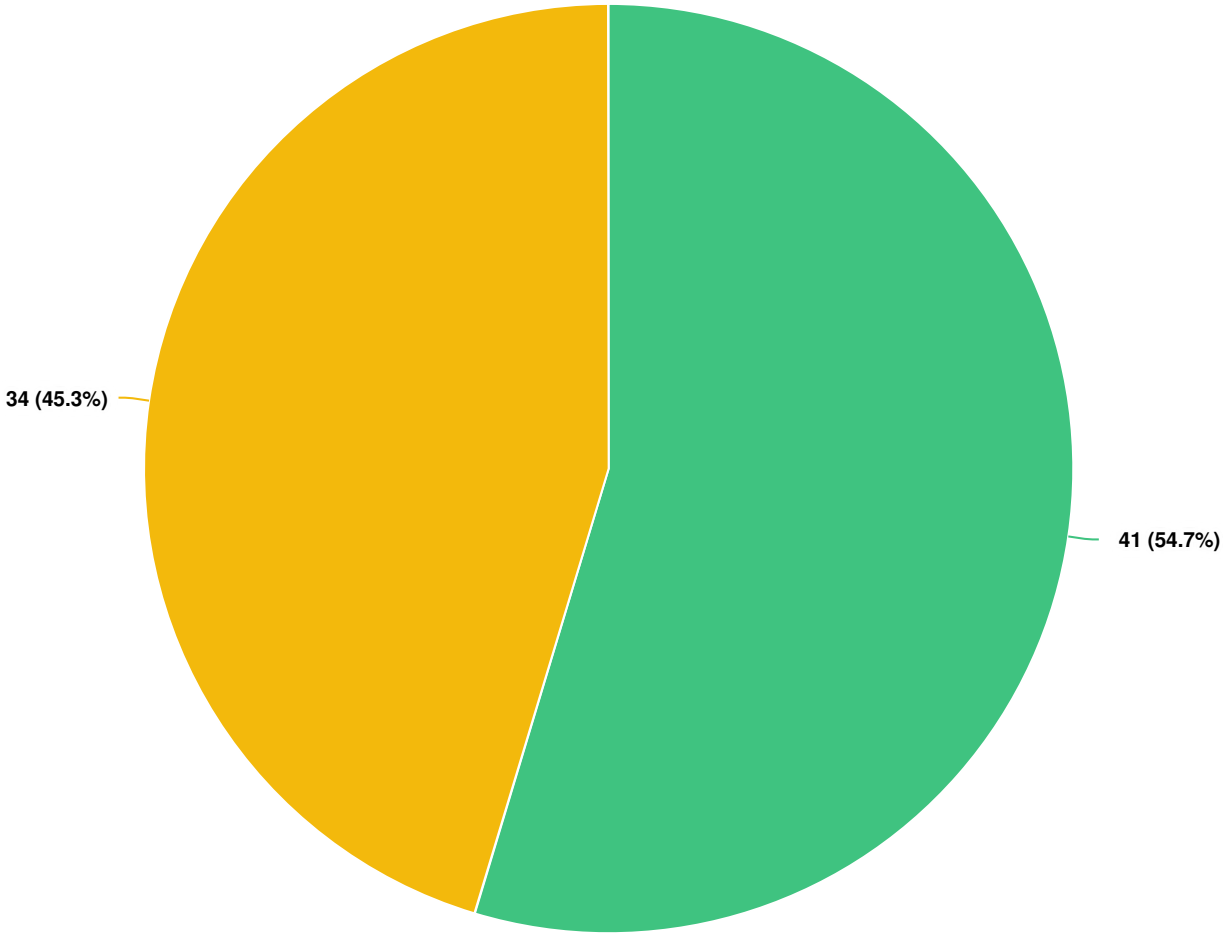
Question options

Let's Talk Bloomington | City's Website | E-subscribe List | Social Media

Optional question (78 response(s), 1 skipped)

Question type: Radio Button Question

There will be opportunities to participate in the Penn Lake Restoration and Rehabilitation Initiative. If you are interested in participating, please check yes and provide your name and e-mail below. We will contact you directly about future participation opportunities.



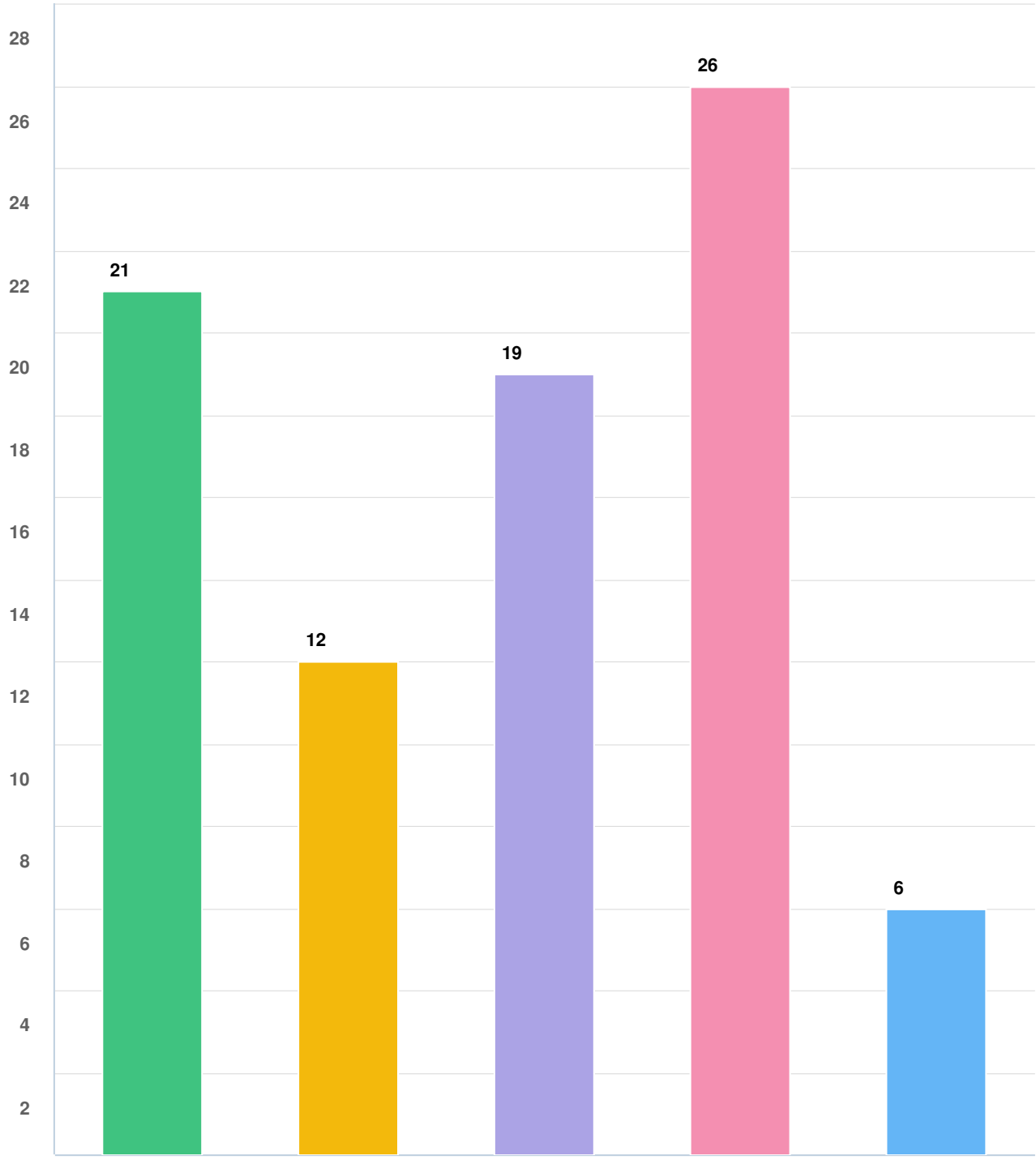
Question options

Yes No

Optional question (75 response(s), 4 skipped)

Question type: Radio Button Question

What kind of participation opportunities interest you most (check all that apply):



Question options

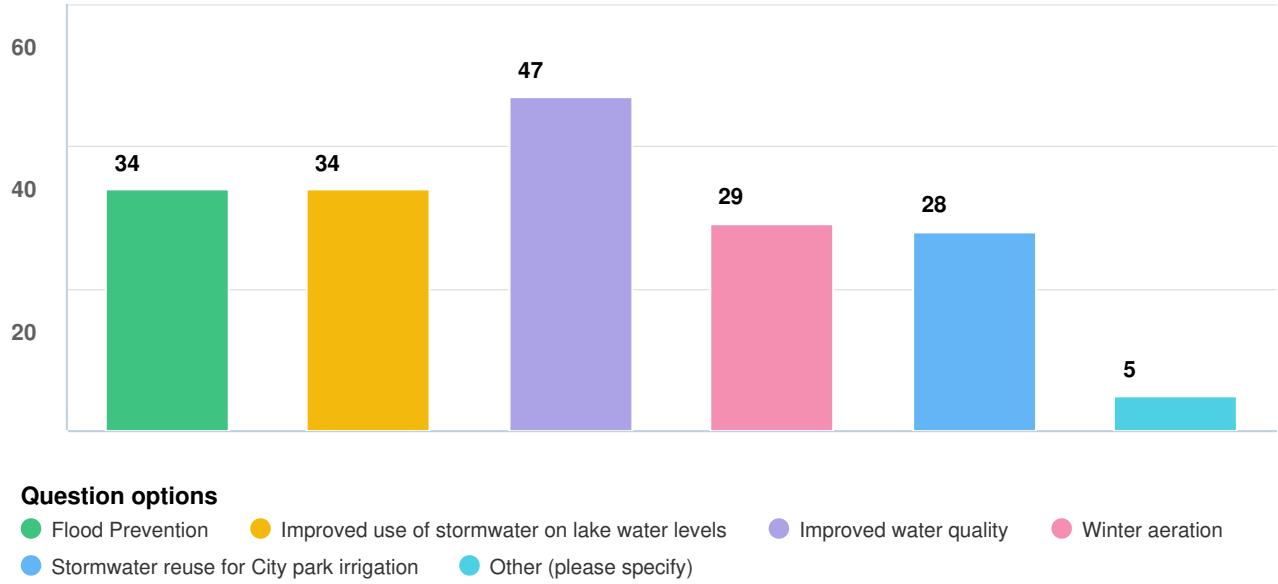
- Community science
- Community liaison
- Event/volunteer planning
- Community advisory board
- Other:
  1. Help at an event.
  2. Clean-up crew.
  3. City's plan for restoration and goals for Penn lakes returning Upper Penn to its original wetland status.
  4. Volunteering.
  5. Participating in the restoration and rehabilitation of Penn Lake.
  6. Design, clean up, anything to make it more usable with seating etc.

ENGAGEMENT TOOL: SURVEY TOOL

Community Value and Interest Survey

Visitors 85	Contributors 61	CONTRIBUTIONS 61

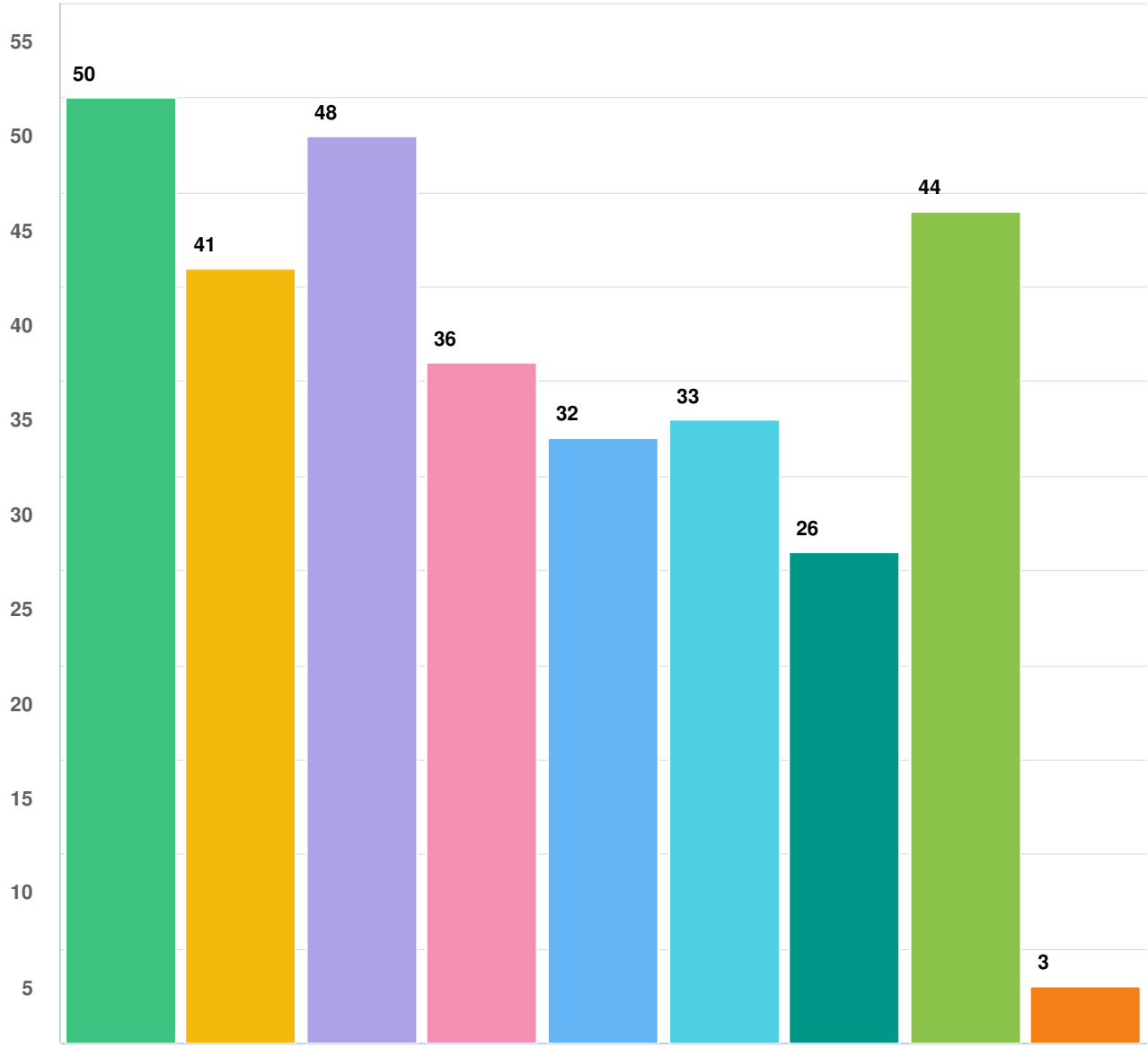
WATER: Select all that you value related to water quality and quantity.



Other:

1. Fishing
2. Rename it to Trump Lake.
3. Improve the sediment holding ponds.
4. Improve the sediment holding ponds.
5. Improve the sediment holding ponds. Find a solution for water levels and the lake drying up if there's a drought. Reduce pollution in the lake.

ECOSYSTEMS: Select all that you value related to ecosystems.



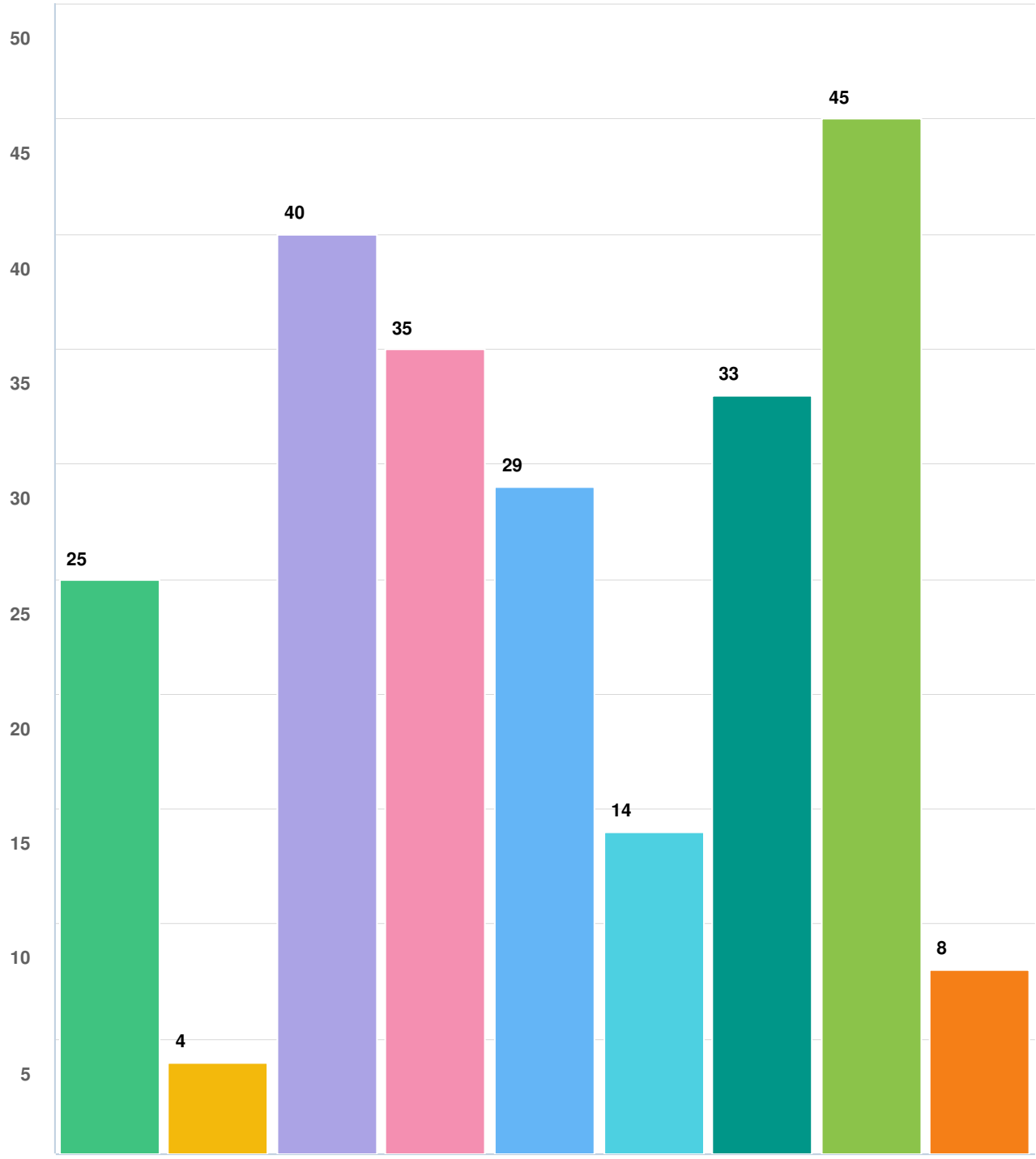
Question options

Birds and bird habitat | Wetlands | Fish | Aquatic Plants | Large mammals, like deer and fox | Otter and other aquatic mammals | Native mussles | Improved ecosystems across all of Penn's watershed | Other (please specify)

Other:

1. A lake that doesn't smell gross. Nice enough to swim.
2. Drilling for oil and natural gas.
3. It's all important and has to be carefully balanced.

RECREATION: Select all that you value related to outdoor recreation.



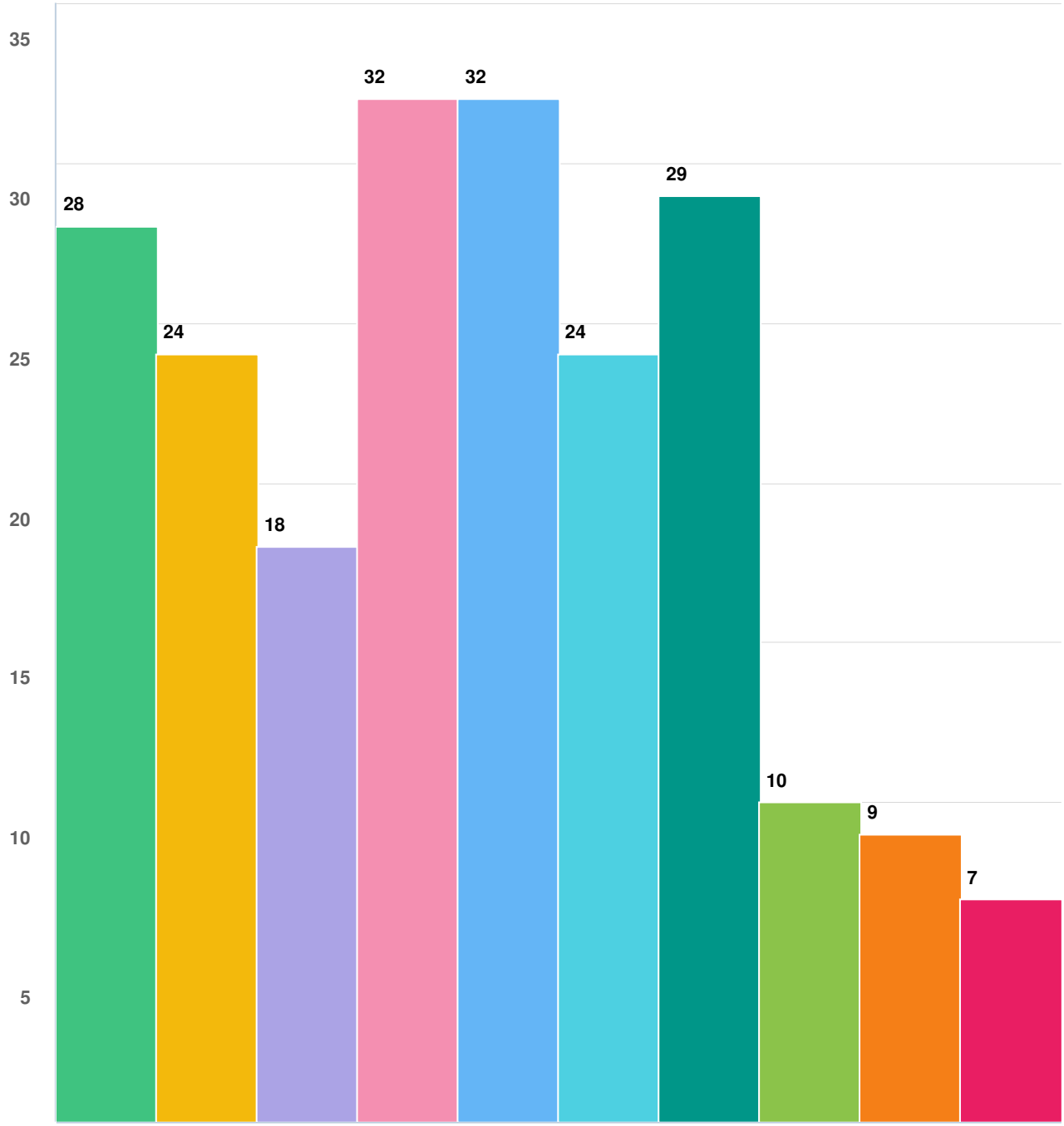
Question options

Fishing | Motorized boating (5 hp engine) | Kayaking or canoeing | Hanging out | Gathering spaces | Swimming | Birding | Walking | Other (please specify)

Other:

1. Paddle boarding. The current boat launch is disgusting. It is deep mud. Needs to have some sand layer on top. Enough to get paddle board not water or even kayak, canoe, etc.
2. Photography of nature.
3. appreciating beauty, mental health.
4. Downhill skiing.
5. Rving, ATVing, Jetskiing, and building a gigantic campfire.
6. I would prefer that managing for the ecosystem has priority over recreation.
7. Playground.
8. Paddleboarding. I love the serene beauty of Penn Lake. It's a peaceful little oasis in the middle of the city. I've talked to many people who work in the area and love to walk around the lake or simply park their car to take a break and get a breath of fresh air in a beautiful, natural setting. Lots of people stop to watch and take photos of the eagles as well.

As the project continues, community groups and activities will develop. Please let us know which group(s) you would like to see implemented.



Question options

Collection of water quality data
Bird identification and counts
Amphibian counts
Trash clean ups
Invasive species removal
Community ecosystem improvement work
Ecoscaping assistance groups (rain gardens, meadow lawns...)
Penn Lake book club
Penn Lake recreation club
Water safety initiatives

Optional question (53 response(s), 8 skipped)

Question type: Checkbox Question

Appendix A.2
Community Stories of Penn Lake

Stories below were collected from 2022-2023 as the Penn Lake Framework and first management pathway were being developed.

Lake Walker

author: Karen

Hi Bloomington! I just moved here in June of last year. Moving is exhausting, so I didn't do much leisurely walking around my neighborhood until it warmed up this spring. But then I discovered the joy (and perfect distance) of walking around Penn Lake. It's truly a beautiful lake, and the park is lovely. I have wondered about its health, though. I've never seen anyone fishing or boating on it or swimming in it. I don't even know if that's allowed. My neighbor told me her son used to go on it, but not anymore. So, yes, I'm interested in doing whatever we can to improve the water quality and help our lake thrive. I knew this little guy is interested, too. Thanks, Karen Lokensgard

Penn Lake in the 1940's

author: Larry Petersen

I don't remember the exact year, but around 1942-43 there was a big rainstorm. The land on the west side of Penn had a large washout area that channeled water from the land over there into Penn Lake. There was a culvert under Penn avenue maybe 2 feet across. There was so much water that it went over Penn and washed out the road. The dirt from that flowed out into the lake made a peninsula that is still there. This area is south of 86th about 450 feet.

What Makes Lower Penn Lake Special

author: Norman Draper

This is not so much a particular story as it is an account of what makes Penn Lake (at least the lower and larger part) so special over the course of the years. My wife and I moved across the street from Lower Penn Lake in 1989, and raised our family in sight of it. We never tire of looking out our living room window at this defining natural feature of our neighborhood. Just this morning, we spotted two bald eagles out on the ice. Now, as the lake begins to ice out, we're scanning the surface for migrating birds. In the past, we've seen mergansers, loons, coots, wood ducks and even swans pass through on their spring way north. The gulls were out today. A few weeks ago, we heard a pair of great horned owls hooing away somewhere in the cottonwoods along the lakeshore. Baltimore orioles annually nest in or near our yard, thanks in large part to the proximity of the lake. Snapping turtles. Herons. Egrets. Foxes. Canada geese and their marching broods. The expanse of the lake affords us wonderful panoramas of the sky and the weather that might be headed our way. So, for us, Lower Penn Lake isn't so much a recreational amenity, as it is a natural and undeveloped one. It's one of the main reasons we continue to live here.

Walking
author: KP

I don’t live on Penn Lake, I live across Penn Avenue but I walk around it almost every single day. It’s a gift to have a little pocket of nature and beauty in my neighborhood and in my life.

Penn Lake Improvement
author: Rita L

We have lived near Penn Lake for 26 years and we love to see so many walkers young and older walking down toward the lake. It is beautiful but what is missing? The freshness and better quality of the water as it was in past years. I believe the sunfish the kids used to catch no longer inhabit our lake. The jetty formerly well maintained now is surrounded by weeds and last year there were holes on its surface. The waterfowl is greatly reduced from when it was a healthy, cleaner water. I love the lake in spite of the neglect it has sustained. However, I dearly wish our city would do what it takes to bring it back to a clean, healthy lake as it was in 1996 when it held fish and abounded with waterfowl. Rita L.

Penn Lake Sparkles
author: Writer on Penn Lake

On sunny days in the warmer months I gaze out my window to Lower Penn Lake. Sure enough the sparkles have cascaded through the water looking like diamonds...millions of them. These sun reflections on the water especially in the afternoon bring me moments of joy and peace as I gaze at this masterpiece before me. In the wintertime sunlight hits the snow like an artist sprinkling glitter on a canvas. These and many more incredible picturesque scenes have been captured right outside our window. On a quiet Sunday, a cross country skier slowly makes his way across the length of the lake, a symbol of peace and that maybe everything is holy and right. Or there is a silent canoe slipping through the velvet waters at sunset putting us to sleep with its gentleness. We bought our house because of our view of this lake and we and our family and friends have enjoyed it for several years. It is a daily gift to our little neighborhood that can quiet our hearts and minds with its beauty…. and have fun fishing on the shoreline or kayaking on the water on a warm afternoon. Penn Lake is an unobtrusive lake that is home to those around it. Let’s nourish it and care for it so many families now and in the future can enjoy the lake for years to come….just like we do.

We HEART Penn Lake
author: Jen Reinen

We are new to lower Penn, as of last November 2021, as mentioned by others, we bought our house mainly because of its location on a lake and the serenity that a lake provides for our family. So far we have built an ice skating rink for our young daughters, and taken them out for their first family canoe ride. When friends come over all the kids love throwing/skipping rocks and watching the wildlife that Lower Penn attracts. We are even fortunate enough to have an eagles nest in our yard, whose eaglets rely on the fish from Penn Lake. If my husband or I can get a paddle board in before work, or after a long day our day is enhanced incrementally. Looking out our window and seeing a lake, any body of water for that matter, is a huge game changer for mental health. It's even really sweet to see neighbors or other people out on the lake enjoying the gifts of lake life. We HEART this lake, and so news of a "Clean Water Plan" provides us hope, both for the wildlife that live here and for future enjoyment for our family.

Glorious Mornings, Calming Evenings

author: CL

My husband and I bought our house on Lower Penn Lake in May. We had some trepidation about the decision, as the house and yard need some work, but we felt that the pleasures of living on the lake would make up for it. We are no longer second-guessing ourselves! In the mornings, we look out to see the sunlight sparkling on the water and can't believe that we get to see this from our own living room. In the evenings, we often sit on the deck and just watch the birds and other critters that abound because of the lake. We have seen an eagle swoop down and catch a fish, and carry it to a neighbor's tree to eat. A visitor recently said, "You must feel like you're on vacation every day! “I got out on the lake in my kayak for the first time yesterday. As I paddled, I was thinking how grateful I am to know that the city is invested in protecting and improving the health of the lake. It is a jewel in the neighborhood, for both people and wildlife.

Please Save Penn Lake!

author: Kiana K.

My history with Penn Lake stems back to 2004. I was 9 years old, and moved into our new home across from Penn Lake on 89th St. I have so many fond memories of walking around the lake with my parents, younger brother and dogs, as well as kayaking, biking and fishing! I moved away in 2014 to attend college in Colorado. It was always so refreshing to return on breaks and feel the comfort of home, walking around Penn Lake once again. Fast forward to August of 2021, my now spouse, 2 young children and our dog are back in Minnesota, searching for our first home to purchase! We felt defeated in the hot market and were running out of options. Then, we received an email from my parents informing us that one of their neighbor's homes was about to hit the market! What were the odds that we would actually have the opportunity to buy one of my childhood neighbor's home, AND move in right across from my parents? Luck was on our side, because we ended up in our Penn Lake lakefront home, surrounded by neighbors who witnessed my upbringing in the neighborhood, and welcomed my family back with open arms. I am so excited to raise my family on Penn Lake, but am so saddened by its current state. I have never seen it in worse condition. I am eager to learn of its rehabilitation and hope to see our water back up to shore, eagles flying, fish jumping, turtles exploring and wildlife exploding once more. We appreciate your efforts restoring Penn Lake's health, IMMENSELY.

The eagle’s lake

author: E.F.

The Lower Penn Lake has been source to many varied forms of wildlife. Foxes, geese, blue herons, birds, beavers, hawks, and a longtime resident eagle. The eagle has nested for years and had babies. He can be seen hunting on the ice in winter and hunting when the offspring are young. One time out on the water in the kayak we watched the adult teaching his offspring to soar. Over our heads… higher and higher the baby went… until it literally flew from sight. This has also been a migratory lake with fascinating formations… it is not a private lake for a few residents… but a public park and area shared both with the community and with stunning wildlife. It is peaceful and beautiful… and it is rare the park is ever completely empty.

Love all the wildlife at Penn Lake ♥

author: G.Z.

I feel so lucky to be able to look out on the lake everyday. I have seen Deer, Geese, Mallards, Cormorants, Mergansers, Egrets, Fox, Turkeys, Eagles, Owls and so many types of Birds to the feeder each day. Penn Lake is a wildlife sanctuary.

Amazing Wildlife

author: J.T.

For its location near two major freeways in a busy suburb, Penn Lake is a wildlife sanctuary. Living here nearly 30 years we have seen fox, eagles, snapping turtles, deer, waterfowl, muskrats, opossum, toads and multiple species of birds. When I share scenes of the lake and wildlife people ask me if I have a lake house up north and I have to explain that, no, I live on a pond in a major metro area. As far as changes to the lake, I would love to see more effort to educate and encourage the neighborhood to consider more native plants that encourage wildlife habitat and improve water quality. Efforts to improve the quality of storm water flowing into the lakes would also be helpful.

Back to Nature

author: WDonigan

I bought a house on Lower Penn Lake in April and like many others, the lake was a huge draw for me. Being able to sit in my office and gaze out at the lake brings a sense of calm and happiness to my otherwise hectic work days. As another poster commented, moving is hard work, so I haven't been able to get out on the lake yet but I have an inflatable row boat ready to go the minute I get a chance. By next summer I plan on having a small dock where I can spend lazy Sunday afternoons dipping my toes in the water while reading a good book. I am doing everything I can to be a good steward to lake and would greatly appreciate support from the city to help keep our lake healthy.

Wildlife Sanctuary

author: Rgrant

When I think of Penn Lake the first thing that comes to mind is all of the wildlife. The eagles are the most prominent and are extremely active in the spring and early summer. Watching them gather items to improve their nest is a cool process to witness. We also regularly see multiple types of ducks, many song birds, foxes, herons, egrets, and more. It’s quite impressive the habitat that exists here. Its great to be able to kayak, canoe, and paddleboard and see others do the same. Penn Lake is a peaceful oasis for those that live on it, those that walk around it daily, those that enjoy the community park, those that paddle around on it, and most of all for the wildlife that call it home. It would be great to see any and all restoration efforts to improve and preserve Penn Lake.

Little slice of heaven

author: Jim and Christi

We love living here in the serene surroundings that Penn Lake has provided. From my kitchen window I can see the waters of Penn Lake sparkling in the morning sun. This scene sends a song to my heart as I begin the day and that feeling lasts throughout. We enjoy the wildlife that varies from year to year, there are deer, fox, eagles, owls, and many types of ducks, some find a stopping place here during migration and some stick around like the geese who seem to love it here too! Penn Lake is beautiful in all of the seasons and we love to walk along the sidewalk because just viewing the water seems to calm the mind and soul. It's hard to believe that the big old world is just a few blocks away because living around Penn Lake gives you the sense that you are living in the great outdoors. It's simply our little slice of heaven!

Serenity

author: Keira

Love taking my dogs for walks near and watching the wildlife. Gives you a piece of serenity in a busy city area. Always get awesome pics of the sunset. Love coming here and taking a moment to enjoy nature, as well as the peace and quiet it brings.

30 years on Upper Penn Lake

author: Ann and Bob Carr

We first walked into our house with our realtor in August of 1992. We looked out to the back yard and saw two large pine trees overlooking the lake and we said "Sold". It didn't matter what the rest of the house looked like, we knew this was the house we wanted. Fast forward 30 years, our 4 kids have grown up playing on the water, the ice and on the islands. Canoeing, kayaking, toading, skating and sliding. Now, sitting on the deck, falling asleep and waking up to all the sounds of the critters on the lake-it is just amazing! We still can't believe we have this right in the heart of Bloomington. Thank you for your efforts on this project.

50plus years of bliss!

author: Betty and Bob

In the Fall of 1963, we purchased a "by owner" home on Upper Penn Lake. What sold us, mainly, was the awesome Oak tree in the back yard. Yes, the lake was swell, and the park behind our home was ideal for enjoying the various "jungle gym" equipment the City provided. And, in the winter, the staffed warming house was well used by the neighborhood kids. The hill on our lot was steeper than the park hill, so hordes of kids went sliding down it during the snowy months. There wasn't much vegetation around the lake, so we had a great, unobstructed view. The lake was blue, too; not the brownish color it is now. That change happened when Best Buy built on 79th and Penn, and the runoff caused the deterioration. Nevertheless, it has been a beautiful place to live, with all the creatures several people have mentioned, plus some NOT mentioned; raccoons, rabbits, chipmunks, squirrels, and even a ground hog, who took up residence under our porch, and which we tried to lure into a huge metal cage we purchased from one of Bud Grants annual garage sales. It ignored all enticements, and left in it's own good time. We hope Bloomington will continue to keep caring and maintaining this natural beauty of parks and ponds.

Enjoyed in All Seasons

author: Tom & Kristin P

We have enjoyed Penn Lake in all seasons - Walking, Kayaking, Skiing and Skating. We have also taken many dramatic pictures of sunset over the lake.